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[Document title] Specifications

[Title of the Invention] An Endermic Liniment

[Scope of the Claim]

[Claim 1] An endermic liniment comprising
5 antibacterial zeolite and trisalt
ethylenediaminehydroxyethyl triacetate.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

10 The present invention relates to an endermic
liniment. More specifically, the present
invention relates to an endermic liniment
containing antibacterial zeolite that has superior
anti-discoloring properties.

15 [0002]

[Conventional Technology]

Antibacterial zeolite is blended into
endermic liniments including cosmetics and quasi-
drugs as a preservative and/or odor eliminating
20 agent.

For example, a composition for antibacterial
sprays (see Patent Document 1) and deodorizing
cosmetics (see Patent Document 2) containing
antibacterial zeolite have been developed. Also,
25 technology that blends silicone into antibacterial

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zeolite as a deodorizing cosmetic with improved
anti-discoloring properties has been disclosed
(see Patent Document 3).

[Patent Document 1]

5 Japanese Patent Laid-Open No. S63-250325 bulletin

[Patent Document 2]

Japanese Patent Laid-Open No. H8-26956 bulletin

[Patent Document 3]

Japanese Patent Laid-Open No. H8-92051 bulletin

10 [0003]

[Problem that the present invention aims to solve]

Antibacterial zeolite by itself is a stable
ingredient for an endermic liniment. However,
blending antibacterial zeolite into an endermic

15 liniment sometimes causes discoloration.

[0004]

The cause of this discoloration is not
clear; there are many raw materials in an endermic
liniment and reactions with such raw materials or
20 their impurities are believed to cause subtle
discoloration.

[0005]

For example, the inventors verified that
blending antibacterial zeolite as a preservative
25 or odor eliminating agent in an antiperspirant

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cosmetic containing aluminum hydroxychloride
causes discoloration that is not preferable for
the cosmetic's appearance. Also, the inventors
verified that blending antibacterial zeolite in an
5 endermic liniment containing various surfactants
results in undesirable discoloration.

[0006]

In view of the aforementioned problem, the
inventors conducted earnest research and amazingly
10 discovered that trisalt
ethylenediaminehydroxyethyl triacetate has an
anti-discoloration effect on antibacterial zeolite
in endermic liniments and thus completed the
present invention.

15 [0007]

The object of the present invention is to
provide an endermic liniment containing
antibacterial zeolite that has the superb effect
of preventing discoloration of endermic liniments
20 and/or reducing the degree of discoloration.

[0008]

[Means to solve the Problem]

That is, the present invention provides an
endermic liniment comprising antibacterial zeolite
25 and trisalt ethylenediaminehydroxyethyl triacetate.

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[0009]

[The embodiments of the present invention]

The present invention is described in detail below.

5 [0010]

The antibacterial zeolite used in the present invention is zeolite that holds antibacterial metal ions in its ion-exchangeable parts. i.e. zeolite whose exchangeable ions are
10 partly or entirely replaced by antibacterial metal ions. In the present invention, zeolite having ammonium ion substitution in addition to antibacterial zeolite ion substitution is also preferable.

15 [0011]

For the zeolite, either natural zeolite or synthetic zeolite can be used. Zeolite is aluminosilicate having a three dimensional skeletal structure; it is represented by the
20 general formula $XM_{2/n}O \cdot Al_2O_3 \cdot YSiO_2 \cdot ZH_2O$. In this general formula, M denotes an exchangeable ion, usually a monovalent or divalent metal ion. n denotes the atomic valence of the (metal) ion. X and Y denote metal oxide and the silica factor,
25 respectively, and Z denotes the number of the

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crystallization water molecules.

[0012]

Specific examples of zeolite include A-type zeolite, X-type zeolite, Y-zeolite, T-type, high silica zeolite, sodalite, mordenite, analcime, 5 crinoptyrolite, chabasite, and erionite. The ion exchange capacity of these zeolites are: 7 meq/g for A-type zeolite, 6.4 meq/g for X-type zeolite, 5 meq/g for Y-zeolite, 3.4 meq/g for T-type, 11.5 10 meq/g for sodalite, 2.6 meq/g for mordenite, 5 meq/g for analcime, 2.6 meq/g for crinoptyrolite, 5 meq/g for chabasite, and 3.8 meq/g for erionite. Any of these has enough capacity for ion exchange with antibacterial metal ions and/or ammonium ions.

15 [0013]

Examples of exchangeable ions in zeolite include sodium ions, calcium ions, potassium ions, magnesium ions, and iron ions. Examples of the antibacterial metal ions to substitute for these 20 ions include silver, copper, zinc, mercury, tin, lead, bismuth, cadmium, chromium, and thallium ions; preferably silver, copper, or zinc ions, and more preferably silver ions.

[0014]

25 The content of the antibacterial ions is

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preferably 0.1-15 mass % of the zeolite. For example, antibacterial zeolite containing 0.1-15% of silver ion and 0.1-8 mass % of copper ion or zinc ion is preferable. On the other hand,

5 zeolite can contain up to 20 mass % of ammonium ions; however, for the purpose of effectively preventing discoloration of the zeolite, 0.5-5% is preferable and 0.5-2 mass % is more preferable.

"Mass %" means the mass percentage in 110°C dry
10 standard zeolite.

[0015]

In the present invention, commercial products can be used for the antibacterial zeolite; the antibacterial zeolite can also be
15 prepared by the following method, for example. That is, zeolite is exposed to a mixed solution containing antibacterial metal ions such as silver ions, copper ions, and zinc ions, prepared in advance, to substitute the aforementioned ions for
20 the exchangeable ions in the zeolite. The exposure can be achieved by the batch method or continuous method (column method, for example) for 3-24 hours, preferably 10-24 hours, at 10-70°C, preferably 40-60°C. The pH of the aforementioned
25 mixed solution should be adjusted to 3-10,

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preferably 5-7. This adjustment is preferable because it prevents precipitation of silver oxide and such on the zeolite surface or in the fine pores. Each ion in the mixed aqueous solution is usually supplied in the form of a salt. For example, silver ions are from silver nitrate, silver sulfate, silver perchlorate, diamminesilver nitrate, diamminesilver sulfate, etc.; copper ions are from copper nitrate (II), copper perchlorate, copper acetate, potassium tetracyanocuprate, copper sulfate, etc.; zinc ions are from zinc nitrate (II), zinc sulfate, zinc perchlorate, zinc thiocyanate, zinc acetate, etc.; mercury ions are from mercury perchlorate, mercury nitrate, and mercury acetate; tin ions are from tin sulfate and such; lead ions are from lead sulfate, lead nitrate, etc.; bismuth ions are from bismuth chloride, bismuth iodide, etc.; cadmium ions are from cadmium perchlorate, cadmium sulfate, cadmium nitrate, and cadmium acetate; chromium ions are from chromium perchlorate, chromium sulfate, chromium ammonium sulfate, chromium nitrate, etc.; thallium ions are from thallium perchlorate, thallium sulfate, thallium nitrate, thallium acetate, etc.

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[0016]

The antibacterial metal ion content in the zeolite can be controlled by adjusting the concentration of each ion (salt) in said mixed aqueous solution. For example, in the case of antibacterial zeolite containing silver ions, an antibacterial zeolite with a silver ion content of 0.1-5% can be obtained by adjusting the silver ion concentration in said mixed aqueous solution to 0.002M/l-0.15M/l. In the case of antibacterial zeolite additionally containing copper ions and zinc ions, an antibacterial zeolite with a copper ion content of 0.1-8% and a zinc ion content of 0.1-8% can be obtained by adjusting the silver ion concentration to 0.1M/l-0.85M/l and the zinc ion concentration to 0.15M/l-1.2M/l in said mixed aqueous solution. For ion exchange of antibacterial zeolite, it is also possible to use solutions, each of which contains each ion, and expose the zeolite with these solutions one after another. The concentration of each ion in each aqueous solution can be determined based on the concentration of each ion in said mixed aqueous solution.

25 [0017]

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After the completion of the ion exchange, the zeolite is thoroughly rinsed and then dried. The drying is preferably done at 105°C-115°C, or under a reduced pressure (1-30 Torr) at 70-90°C.

5 [0018]

Ion exchange for organic ions and/or for ions for which there isn't an adequate water soluble salt, such as tin and bismuth, can be done by using an organic solvent solution such as an alcohol or acetone to prevent precipitation of slightly soluble basic salts.

[0019]

The blend ratio of the antibacterial zeolite in the endermic liniment is not limited in particular. It is determined based on the reason why the antibacterial zeolite is added and also on the product form of the endermic liniment.

For example, when blended in as a preservative, the blend ratio is usually 0.05-10 mass % of the total amount of the endermic liniment. As another example, when blended in as a bactericide, the blend ratio is usually 0.1-90 mass % of the total amount of the endermic liniment, depending on the product form. For example, for lotion or cream type endermic

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liniments 0.1-20 mass % of the total amount of the
endermic liniment is preferable; for powder type
endermic liniments 0.5-80 mass % of the total
amount of the endermic liniment is preferable; for
5 stick type endermic liniments 0.5-60 mass % of the
total amount of the endermic liniment is
preferable; and for spray type endermic liniments
0.5-50 mass % of the total amount of the endermic
liniment is preferable.

10 [0020]

The trisalt ethylenediaminehydroxyethyl
triacetate used in the present invention, as a
chelating agent, is a prior art ingredient of an
endermic liniment. Examples of the salt include
15 alkali metal salts such as sodium and potassium;
sodium salt is preferable. Commercial products
such as Clewat OH-300 (Teikoku Kagaku Sangyo Co.,
Ltd.) are used. Dry powder of trisalt
ethylenediaminehydroxyethyl triacetate is blended
20 into the endermic liniment of the present
invention usually in the form of trihydrate.

[0021]

In the present invention, trisalt
ethylenediaminehydroxyethyl triacetate
25 specifically acts as an anti-discoloration agent

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for an endermic liniment containing antibacterial zeolite. EDTA-3Na and such, which are well known as a chelating agent and have a chemical structure similar to that of trisalt

5 ethylenediaminehydroxyethyl triacetat such as trisodium ethylenediaminehydroxyethyl triacetate, do not have the anti-discoloration effect for endermic liniments.

[0022]

10 The blend ratio of the trisalt ethylenediaminehydroxyethyl triacetate is determined based on the blend ratio of the antibacterial zeolite and the product form. It is usually 0.01-5 mass % (unhydrated equivalent) of
15 the total amount of the skin treatment composition.

[0023]

When using the endermic liniment of the present invention for applications such as odor eliminating agents and antiperspirant cosmetics,
20 it is preferable to blend in an aluminum compound that is an antiperspirant.

[0024]

In addition to the aforementioned essential ingredients, other ingredients commonly used in
25 endermic liniments, for example one, two or more

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of those listed below, are blended as necessary in the endermic liniment of the present invention; the preparation can be conducted for the target formulation with a conventional method.

5 [0025]

Examples of the powder ingredients include inorganic powders (for example, talc, kaolin, mica, sericite, muscovite, phlogopite, synthetic mica, lepidolite, biotite, vermiculite, magnesium
10 carbonate, calcium carbonate, aluminum silicate, barium silicate, calcium silicate, magnesium silicate, strontium silicate, tungstic acid metal salt, magnesium, silica, barium sulfate, firing calcium sulfate (calcined gypsum), calcium
15 phosphate, fluorine-apatite, hydroxy apatite, ceramic powder, metallic soaps (for example, zinc myristate, calcium palmitate, and aluminum stearate), and boron nitride); organic powders (for example, polyamide resin powder (nylon
20 powder), polyethylene powder, poly methyl methacrylate powder, benzoguanamine resin powder, polytetrafluoroethylene powder, and cellulose powder); inorganic white pigments (for example, titanium dioxide and zinc oxide); inorganic red
25 pigments (for example, iron oxide (red iron oxide))

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and iron titanate); inorganic brown pigments (for example, γ -iron oxide); inorganic yellow pigments (for example, yellow iron oxide and loess); inorganic black pigments (for example, black iron oxide and low oxides of titanium); inorganic purple pigments (for example, manganese violet, cobalt violet); inorganic green pigments (for example, chromium oxide, chromium hydroxide, and cobalt titanate); inorganic blue pigments (for example, ultramarine blue and Berlin blue); pearl pigment (for example, titania coated mica, titania coated bismuth oxychloride, titania coated talc, coloration titania coated mica, bismuth oxychloride, fish scale flakes); metal powder pigments (for example, aluminum powder, copper powder); organic pigments such as Zr, barium or aluminum lake (for example, organic pigments such as red 201, red 202, red 204, red 205, red 220, red 226, red 228, red 405, orange 203, orange 204, yellow 205, yellow 401 and blue 404, as well as red 3, red 104, red 106, red 227, red 230, red 401, red 505, orange 205, yellow 4, yellow 5, yellow 202, yellow 203, green 3 and blue 1; and natural colors (for example, chlorophyll and β -carotene).

[0026]

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Examples of the liquid fats and oils include
avocado oil, tsubaki oil, turtle fatty acid,
macademia nut oil, corn oil, mink oil, olive oil,
rapeseed oil, egg yolk oil, sesame oil, persic oil,
5 wheat germ oil, sasanqua oil, castor oil, linseed
oil, safflower oil, cotton seed oil, perilla oil,
soybean oil, peanut oil, tea seed oil, Japanese
nutmeg oil, rice bran oil, Chinese gimlet oil,
Japan gimlet oil, jojoba oil, germ oil, and
10 triglycerin.

[0027]

Examples of the solid fats and oils include
cacao butter, coconut oil, hydrogenated coconut
oil, palm oil, palm kernel oil, Japanese core wax
15 nucleus oil, hydrogenated oil, Japanese core wax,
and hydrogenated castor oil.

[0028]

Examples of the waxes include beeswax,
candelilla wax, cotton wax, carnauba wax, bayberry
20 wax, tree wax, whale wax, montan wax, bran wax,
lanolin, kapok wax, lanolin acetate, liquid
lanolin, sugar cane wax, lanolin fatty acid
isopropyl ester, hexyl laurate, reduced lanolin,
jojoba wax, hard lanolin, shellac wax, POE lanolin
25 alcohol ether, POE lanolin alcohol acetate, POE

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cholesterol ether, lanolin fatty acid polyethylene glycol, POE hydrogenated lanolin ethyl alcohol ether, ceresin, and microcrystalline wax.

[0029]

5 Examples of the hydrocarbon oils include liquid petrolatum, ozocerite, squalane, pristane, paraffin, squalene, and petrolatum.

[0030]

10 Examples of the higher fatty acids include lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, undecylenic acid, isostearic acid, linolic acid, linoleic acid, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA).

15 [0031]

20 Examples of the higher alcohols include straight chain alcohols (for example, lauryl alcohol, cetyl alcohol, stearyl alcohol, behenyl alcohol, myristyl alcohol, oleyl alcohol, and cetostearyl alcohol) and branched chain ethyl alcohols (for example, mono stearyl glycerin ether (batyl alcohol), 2-decyltetradecynol, lanolin alcohol, cholesterol, phytosterol, hexyl dodecanol, iso stearyl alcohol, and octyl dodecanol).

25 [0032]

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Examples of the ester oils include isopropyl myristate, cetyl octanoate, octyl dodecyl myristate, isopropyl palmitate, butyl stearate, hexyl laurate, myristil myristate, decyl oleate, 5 dimethyl hexyl decyl octanoate, cetyl lactate, myristil lactate, lanolin acetate, iso cetyl stearate, iso cetyl isostearate, cholesteryl hydroxy 12-stearate, di-2-ethylene glycol ethylhexanoate, dipentaerythritol fatty acid ester, 10 n-alkylene glycol monoisostearate, neopentyl glycol dicaprate, diisostearyl malate, glyceryl di-2-heptylundecanoate, trimethylolpropane tri-2-ethylhexanoate, trimethylolpropane triisostearate, tetra-2-pentaerythritol ethylhexanoate, glycerin, 15 tri-2-ethylhexanoate, glyceryl trioctanoate, glycerin triisopalmitate, trimethylolpropane triisostearate, cetyl 2-ethyl hexanoate, 2-ethylhexyl palmitate, glycerin trimyristate, tri-2-heptyl undecanoic acid glyceride, methyl castor 20 oil fatty acid, oleyl oleate, aceto glyceride, 2-heptyl undecyl palmitate, diisobutyl adipate, 2-octyldodecyl N-lauroyl-L-glutamate, di-2-heptyl undecyl adipate, ethyl laurate, di-2-ethylhexyl sebacate, 2-hexyl decyl myristate, 2-hexyl decyl 25 palmitate, 2-hexyl decyl adipate, diisopropyl

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sebacate, 2-ethylhexyl succinate, and triethyl
citrate.

[0033]

Examples of the silicone oils include chain
5 polysiloxanes (for example, dimethylpolysiloxane,
methylphenyl polysiloxane, and diphenyl
polysiloxane); ring polysiloxanes (for example,
octamethylcyclotetrasiloxane, decamethyl
cyclopenta siloxane, and dodecamethyl cyclohexa
10 siloxane), silicone resins forming a three-
dimensional network structure, silicone rubbers,
and various modified polysiloxanes (amino-modified
polysiloxane, polyether-modified polysiloxane,
alkyl-modified polysiloxane, and andfluorine-
15 modified polysiloxane).

[0034]

Examples of the anionic surfactants include
fatty acid soaps (for example, sodium laurate and
sodium palmitate); higher alkyl sulfuric ester
20 salts (for example, sodium lauryl sulfate and
potassium laurylsulfate); alkylether sulfuric
ester salts (for example, POE-triethanolamine
laurylsulfate and sodium POE-lauryl sulfate); N-
acyl sarcosinic acids (for example, sodium N-
25 lauroyl sarcosinate); higher fatty acid ester

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sulfates (for example, hydrogenated coconut oil
aliphatic acid glycerin sodium sulfate); N-acyl
glutamates (for example, mono sodium N-
lauroylglutamate, disodium N-stearoylglutamate,
5 and sodium N-myristoyl-L-glutamate); sulfated oils
(for example, turkey red oil); POE-alkylether
carboxylic acid; POE-alkylarylether carboxylate;
 α -olefin sulfonate; higher fatty acid ester
sulfonates; sec-alcohol sulfates; higher fatty
10 acid alkyl amide sulfates; sodium lauroyl
monoethanolamine succinates; ditriethanolamine N-
palmitoylaspartate; and sodium caseinate.

[0035]

Examples of the cationic surfactants include
15 alkyltrimethylammonium salts (for example,
stearyltrimethyl ammonium chloride and
lauryltrimethyl ammonium chloride) alkylpyridinium
salts (for example, cetylpyridinium chloride),
distearyldimethylammonium chloride
20 dialkyldimethylammonium salt; poly (N,N'-dimethyl-
3,5-methylene piperidinium) chloride; alkyl
quaternary ammonium salts; alkyl dimethylbenzyl
ammonium salts; alkyl isoquinolinium salts;
dialkylmorpholine salts; POE alkyl amines; alkyl
25 amine salts; polyamine fatty acid derivatives;

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amylalcohol fatty acid derivatives; benzalkonium chloride; and benzethonium chloride.

[0036]

Examples of the ampholytic surfactants

5 include: imidazoline type ampholytic surfactants (for example, 2-undecyl-N,N,N-(hydroxyethyl carboxymethyl)-2-imidazoline sodium salt and 2-coco yl-2-imidazolinium hydroxide-1-carboxyethyloxy 2 sodium salt); and betaine type
10 surfactants (for example, 2-heptadecyl-n-carboxymethyl-n-hydroxyethyl imidazolinium betaine, lauryldimethylaminoacetic acid betaine, alkyl betaine, amide betaine, and sulfobetaine).

[0037]

15 Examples of the lipophilic nonionic surface active agent include sorbitan fatty acid esters (for example, sorbitan mono oleate, sorbitan mono isostearate, sorbitan mono laurate, sorbitan mono palmitate, sorbitan mono stearate, sorbitan sesqui
20 oleate, sorbitan trioleate, diglycerol sorbitan penta-2-ethylhexylate, diglycerol sorbitan tetra-2-ethylhexylate); glycerin polyglycerin aliphatic acids (for example, mono-cottonseed oil fatty acid glycerin, glyceryl monoerucate, glycerin
25 sesquioleate, glyceryl monostearate, α, α' -

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glyceryl oleate pyroglutamate, glyceryl mono
stearate mono malate); propylene glycol fatty
acid esters (for example, propylene glycol
monostearate); hydrogenated castor oil
5 derivatives; and glycerin alkylethers.

[0038]

Examples of the hydrophilic nonionic surface
active agents include: POE-sorbitan fatty acid
esters (for example, POE-sorbitan monooleate, POE-
10 sorbitan monostearate, POE-sorbitan monooleate, and
POE-sorbitan tetraoleate); POE sorbitol fatty acid
esters (for example, POE sorbitol monolaurate,
POE-sorbitol monooleate, POE-sorbitolpentaoleate,
and POE-sorbitol monostearate); POE-glycerin fatty
15 acid esters (for example, POE-monooleates such as
POE-glycerin monostearate, POE-glycerin
monoisostearate, and POE-glycerin triisostearate);
POE-fatty acid esters (for example, POE-distearate,
POE-monodioleate, and ethylene glycol distearate);
20 POE-alkylethers (for example, POE-lauryl ether,
POE-oleyl ether, POE-stearyl ether, POE-behenyl
ether, POE-2-octyl dodecyl ether, and POE-
cholestanol ether); POE/POP-alkylethers (for
example, POE/POP-cetyl ether, POE/POP-2-decyl
25 tetradecyl ether, POE/POP-monobutyl ether,

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POE/POP-lanolin hydrate, and POE/POP-glycerin ether); POE-castor oil hydrogenated castor oil derivatives (for example, POE-castor oil, POE-hydrogenated castor oil, POE-hydrogenated castor oil monoisostearate, POE-hydrogenated castor oil triisostearate, POE-hydrogenated castor oil monopyroglutamic monoisostearic diester, and POE-hydrogenated castor oil maleic acid); POE-beeswax/lanolin derivatives (for example, POE-sorbitol beeswax); alkanol amides (for example, coconut fatty acid diethanol amide, lauric acid monoethanol amide, and aliphatic acid isopropanol amide); POE-propylene glycol fatty acid esters; POE-alkyl amine; POE-fatty acid amide; sucrose fatty acid ester; alkyl ethoxy dimethylamine oxides; and trioleyl phosphoric acid.

[0039]

Examples of the humectant include polyethylene glycol, propylene glycol, glycerin, 1,3-butylene glycol, xylitol, sorbitol, maltitol, chondroitin sulfate, hyaluronic acid, mucoitin sulfuric acid, charonic acid, atelocollagen, cholesteryl-12-hydroxy stearate, sodium lactate, bile salt, dl-pyrrolidone carboxylic acid salt, short chain soluble collagen, diglycerin (EO)PO

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adduct, chestnut rose fruit extract, yarrow
extract, and sweet clover extract.

[0040]

Examples of the natural water-soluble

5 polymer include: plant-type polymers {for example,
gum arabic, gum tragacanth, galactan, guar gum,
carob gum, karaya gum, carrageenan, pectin, agar,
quince seed (*Cydonia oblonga*), algae colloids
(brown algae extract), starches (rice, corn,
10 potato, and wheat), and glycyrrhizic acid};
microorganism-type polymers (for example, xanthan
gum, dextran, succinoglucan, and pullulan); and
others (for example, fish-derived collagen, fish-
derived gelatin, wheat protein, and silk protein).

15 [0041]

Examples of the semisynthetic water-soluble
polymers include: starch-type polymers (for
example, carboxymethyl starch and
methylhydroxypropyl starch); cellulosic polymers
20 (for example, methyl cellulose, ethyl cellulose,
methylhydroxypropyl cellulose, hydroxyethyl
cellulose, cellulose sodium sulfate, hydroxypropyl
cellulose, carboxymethyl-cellulose, sodium
carboxymethyl cellulose, crystal cellulose, and
25 cellulose powder); and alginic acid-type polymers

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(for example, sodium alginate and propyleneglycol alginate).

[0042]

Examples of the synthetic water-soluble
5 polymers include: vinyl polymers (for example, polyvinyl alcohol, polyvinyl methyl ether, polyvinylpyrrolidone, carboxy vinyl polymer); polyoxyethylene-type polymers (for example, a copolymer of polyethylene glycol 20,000, 40,000,
10 or 60,000 and polyoxyethylene polyoxypropylene); acrylic polymers (for example, sodium polyacrylate, polyethylacrylate, and polyacrylamide); polyethyleneimine; and cationic polymers.

[0043]

15 Examples of the thickeners include: gum arabic, carrageenan, karaya gum, gum tragacanth, carob gum, quince seed (Cydonia oblonga), casein, dextrin, gelatin, sodium pectate, sodium arginate, methyl cellulose, ethyl cellulose, CMC, hydroxy
20 ethyl cellulose, hydroxypropyl cellulose, PVA, PVM, PVP, sodium polyacrylate, carboxy vinyl polymer, locust bean gum, guar gum, tamarind gum, cellulose dialkyl dimethylammonium sulfate, xanthan gum, aluminum magnesium silicate,
25 bentonite, hectorite, AlMg silicate (beagum),

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laponite, and silicic acid anhydride.

[0044]

Examples of the ultraviolet absorbents include the following compounds.

5 (1) Benzoic acid-type ultraviolet absorbents

For example, p-aminobenzoic acid (hereafter abbreviated as PABA), PABA monoglycerin ester, N,N-dipropoxy PABA ethyl ester, N,N-diethoxy PABA ethyl ester, N,N-dimethyl PABA ethyl ester, N,N-
10 dimethyl PABA butyl ester, and N,N-dimethyl PABA ethyl ester.

(2) Anthranilic acid-type ultraviolet absorbents

For example, homo mentyl-N-acetyl anthranilate.

15 (3) Salicylic acid-type ultraviolet absorbents

For example, amyl salicylate, mentyl salicylate, homo mentyl salicylate, octyl salicylate, phenyl salicylate, benzil salicylate, and p-isopropanol phenyl salicylate.

20 (4) Cinnamic acid-type ultraviolet absorbents

For example, octyl cinnamate, ethyl-4-isopropyl cinnamate, methyl-2,5-diisopropyl cinnamate, ethyl-2,4-diisopropyl cinnamate, methyl-2,4-diisopropyl cinnamate, propyl-p-methoxy
25 cinnamate, isopropyl-p-methoxy cinnamate, isoamyl-

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p-methoxy cinnamate, octyl-p-methoxy cinnamate (2-ethylhexyl-p-methoxy cinnamate), 2-ethoxyethyl-p-methoxy cinnamate, cyclohexyl-p-methoxy cinnamate, ethyl- α -cyano- β -phenyl cinnamate, 2-ethylhexyl- α -cyano- β -phenyl cinnamate, and glyceryl mono-2-ethyl hexanoyl-di-p-methoxy cinnamate.

(5) Triazine-type ultraviolet absorbers

For example, bisresorsinyl triazine.

More specifically, bis{[4-(2-ethylhexyloxy)-2-hydroxy]phenyl}-6-(4-methoxyphenyl) 1,3,5-triazine, 2,4,6-tris {4-(2-ethylhexyloxycarbonyl)anilino}1,3,5-triazine, etc.

(6) Other ultraviolet absorbers

For example, 3-(4'-methylbenzylidene)-d,l-camphor, 3-benzylidene-d,l-camphor, 2-phenyl-5-methyl benzoxazol, 2-(2'-hydroxy-5'-methylphenyl) benzotriazol, 2-(2'-hydroxy-5'-t-octylphenyl) benzotriazol, 2-(2'-hydroxy-5'-methylphenyl) benzotriazol, dibenzaladine, dianisoylmethane, and 4-methoxy-4'-t-butyl dibenzoyl-methane, 5-(3,3-dimethyl-2-norbornylidene)-3-pentane-2-one. Pyridazinone derivatives such as dimorpholino pyridazine.

[0045]

Examples of the sequestering agents include:

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1-hydroxy ethane-1,1-diphosphonic acid, 1-hydroxy
ethane-1,1-diphosphonic acid tetrasodium salt,
disodium edetate, trisodium edetate, tetrasodium
edetate, sodium citrate, sodium polyphosphate,
5 sodium metaphosphate, gluconic acid, phosphoric
acid, citric acid, ascorbic acid, and succinic
acid.

[0046]

Examples of the lower alcohols include
10 ethanol, propanol, isopropanol, isobutanol, and t-
butyl alcohol.

[0047]

Examples of the polyhydric alcohols include:
dihydric alcohols (for example, ethylene glycol,
15 propylene glycol, trimethylene glycol, 1,2-
butylene glycol, 1,3-butylene glycol,
tetramethylene glycol, 2,3-butylene glycol,
pentamethylene glycol, 2-butene-1,4-diol, hexylene
glycol, and octylene glycol); trihydric alcohols
20 (for example, glycerin and trimethylolpropane);
tetrahydric alcohols (for example, pentaerythritol
such as 1,2,6-hexanetriol); pentahydric alcohols
(for example, xylitol); hexahydric alcohols (for
example, sorbitol, mannitol); polyhydric alcohol
25 polymers (for example, diethylene glycol,

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dipropylene glycol, triethylene glycol,
polypropylene glycol, tetraethylene glycol,
diglycerin, polyethylene glycol, triglycerin,
tetraglycerin, and polyglycerin); dihydric alcohol
5 alkylethers (for example, ethylene glycol
monomethyl ether, ethylene glycol monoethyl ether,
ethylene glycol monobutyl ether, ethylene glycol
monophenyl ether, ethylene glycol monohexyl ether,
ethylene glycol mono 2-methyl hexyl ether,
10 ethylene glycol isoamyl ether, ethylene glycol
benzyl ether, ethylene glycol isopropyl ether,
ethylene glycol dimethylether, ethylene glycol
diethyl ether, and ethylene glycol dibutyl ether);
dihydric alcohol ether esters (for example,
15 ethylene glycol monomethyl ether acetate, ethylene
glycol monoethyl ether acetate, ethylene glycol
monobutyl ether acetate, ethylene glycol
monophenyl ether acetate, ethylene glycol
diadipate, ethylene glycol disuccinate, diethylene
20 glycol monoethyl ether acetate, diethylene glycol
monobutyl ether acetate, propylene
glycolmonomethyl ether acetate, propylene glycol
monoethyl ether acetate, propylene glycol
monopropyl ether acetate, and propylene glycol
25 monophenyl ether acetate); glycerin mono alkyl

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ethers (for example, xylyl alcohol, selachyl alcohol, and batyl alcohol); sugar alcohols (for example, sorbitol, maltitol, maltotriose, mannitol, sucrose, erythritol, glucose, fructose, starch amyloolysis sugar, maltose, xylitose, and alcohol prepared by the reduction of starch amyloolysis sugar); glysolid; tetrahydro furfuryl alcohol; POE-tetrahydro furfuryl alcohol; POP-butyl ether; POP/POE-butyl ether; tripolyoxypropylene glycerin ether; POP-glycerin ether, POP-glycerin ether phosphoric acid; POP/POE-pentane erythritol ether, and polyglycerin.

[0048]

Examples of the monosaccharides include:

trioses (for example, D-glyceryl aldehyde and dihydroxyacetone); tetroses (for example, D-erythrose, D-erythrulose, D-threose, and erythritol); pentoses (for example, L-arabinose, D-xylose, L-lyxose, D-arabinose, D-ribose, D-ribulose, D-xylulose, and L-xylulose); hexoses (for example, D-glucose, D-talose, D-psicose, D-galactose, D-fructose, L-galactose, L-mannose, and D-tagatose); heptoses (for example, aldoheptose and heptose); octoses (for example, octulose); deoxysugars (for example, 2-deoxy-D-ribose, 6-

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deoxy-L-galactose, and 6-deoxy-L-mannose); amino
sugars (for example, D-glucosamine, D-
galactosamine, sialic acid, amino uronic acid, and
muramic acid); and uronic acid (for example, D-
5 glucuronic acid, D-mannuronic acid, L-guluronic
acid, D-galacturonic acid, and L-iduronic acid).

[0049]

Examples of the oligosaccharides include
sucrose, umbelliferose, lactose, planteose,
10 isolignoses, α, α -trehalose, raffinose, lignoses,
umbilicine, stachyose and verbascose.

[0050]

Examples of the polysaccharides include
cellulose, quince seed, chondroitin sulfate,
15 starch, galactan, dermatan sulfate, glycogen, gum
arabic, heparan sulfate, hyaluronic acid, traganth
gum, keratan sulfate, chondroitin, xanthan gum,
mucoitin sulfuric acid, guar gum, dextran, kerato
sulfate, locustbean gum, succinoglucane, and
20 charonic acid.

[0051]

Examples of the amino acids include neutral
amino acids (for example, threonine and cysteine)
and basic amino acids (for example, hydroxylysine).
25 Examples of the amino acid derivatives include

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sodium acyl sarcosinate (sodium N-lauroyl sarcosinate), acyl glutamate, acyl β -alanine sodium, glutathione, and pyrrolidone carboxylic acid.

5 [0052]

Examples of the organic amines include monoethanolamine, diethanolamine, triethanolamine, morpholine, triisopropanolamine, 2-amino-2-carbinyl-1,3-propanediol, and 2-amino-2-carbinyl-
10 1-propanol.

[0053]

Examples of the high polymer emulsions include acrylic resin emulsions, ethyl polyacrylate emulsions, acryl resin liquids,
15 polyacrylic alkyl ester emulsions, polyvinyl acetate resin emulsions, and natural rubber latex.

[0054]

Examples of the pH adjustment agents include buffers such as lactic acid-sodium lactate, citric
20 acid-sodium citrate, and succinic acid-sodium succinate.

[0055]

Examples of the vitamins include vitamins A, B1, B2, B6, C and E as well as their derivatives,
25 pantothenic acid and its derivatives, and biotin.

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[0056]

Examples of the antioxidants include tocopherols, dibutyl hydroxytoluene, butyl hydroxyanisole, and gallic ester.

5 [0057]

Examples of the antioxidation auxiliary agents include phosphoric acid, citric acid, ascorbic acid, maleic acid, malonic acid, succinic acid, fumaric acid, cephalin, hexameta phosphate, phytic acid, and ethylene diamine tetraacetic acid.

[0058]

Examples of other possible ingredients include antiseptics (methylparaben, ethylparaben, butylparaben, and phenoxyethanol); anti-inflammatory agents (for example, glycyrrhizic acid derivatives, glycyrrhetic acid derivatives, salicylic acid derivatives, hinokitiol, zinc oxide, and allantoin); whitening agents (for example, creeping saxifrage extract, arbutin, tranexamic acid, L-ascorbic acid, magnesium L-ascorbyl phosphate, L-ascorbic acid glucoside, and potassium 4-methoxysalicylate); various extracts (for example, Phellodendri Cortex, goldthread, lithospermum root, Paeonia lactiflora, Swertia japonica, Birch, sage, loquat, carrot, aloe, Malva

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sylvestris, Iris, grape, Coix ma-yuen, sponge
gourd, lily, saffron, Cnidium officinale, sheng
jiang, Hypericum erectum, Ononis, garlic, Guinea
pepper, chen pi, Ligusticum acutilobum, and
5 seaweed), activators (royal jelly, photosensitive
substances, and cholesterol derivatives); blood
circulation promoting agents (for example, nonyl
acid valenyl amide, nicotinic acid benzyl esters,
nicotinic acid β -butoxy ethyl esters, capsaicin,
10 gingeron, cantharis tincture, Ichthammol, tannic
acid, α -borneol, tocopherol nicotinate, inositol
hexanicotinate, cyclandelate, cinnarizine,
tolazoline, acetylcholine, verapamil,
cepharanthine, and γ -orizanol); anti-seborrhea
15 agents (for example, sulfur and thiantol); and
antiinflammatory agents (for example, thiotaaurine
and hypotaaurine); and bactericides (for example,
benzoic acid and its salts, isopropylmethyl phenol,
undecylenic acid and its salts, undecylenic acid
20 monoethanol amide, cetyltrimethyl ammonium
chloride, cetylpyridinium chloride, benzalkonium
chloride, benzethonium chloride,
alkyldiaminoethylglycine chloride, chlorhexidine
chloride, orthophenyl phenol, chlorhexidine
25 gluconate, cresol, chloramine T, chlorxylenol,

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chlorcresol, chlorfenesin, chlorobutanol, 5-chloro-2-methyl-4-isothiazoline-3-one, salicylic acid and its salts, 1,3-dimethylol-5,5-dimethylhydantoin, alkylisoquinolium bromide, 5 domiphen bromide and its salt, sorbic acid and its salts, thymol, thylum, thiram, dehydroacetic acid and its salt, triclosan, trichlorocarbanilide, p-oxybenzoic ester, p-chlorphenol, halocarbon, pyrogallol, phenol, hexachlorophene, 2-methyl-4-10 isothiazoline-3-one, NN'-Methylenebis(N'-(3-hydroxymethyl-2,5-dioxo-4-imidazolidinyl)urea), sodium lauroylsarcosine, and resorcin).

[0059]

[Examples]

15 The present invention is described in detail below by referring to Examples. The present invention is not limited to them. The blend ratios are in mass-percentage units unless specified otherwise.

20 [0060]

Recipes shown in Table 1 and Table 2 were used to prepare powder lotion-type antiperspirant lotions and the degree of discoloration was evaluated visually. For Comparative examples, a 25 recipe containing no trisodium

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ethylenediaminehydroxyethyl triacetate and a recipe containing a chelating agent $\text{EDTA-3Na} \cdot 2\text{H}_2\text{O}$ instead of trisodium ethylenediaminehydroxyethyl triacetate were investigated. The degree of

5 discoloration was evaluated by giving ○ to those that are within the acceptable range for endermic liniment, and × to those that are outside of this range.

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[0061]

[Table 1]

	Examples			Comparative examples						
	1	2	3	1	2	3	4	5	6	7
Ion-exchanged water	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Ethanol (95%, synthesized)	50	50	50	50	50	50	50	50	50	50
Chlorhydroxy aluminum 50% aqueous solution (Antiperspirant)	20	20	20	20	20	20	20	20	20	20
PDE (10) POP (20) decyltetradecyl ether (dispersing agent)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Anti-bacterial zeolite A (preservative)	1	1	1	1	1	1	1	1	1	1
Trisodium ethylenediaminehydroxy ethyl triacetate	0.1	0.05	0.01							
EDTA-3Na·2H ₂ O					0.3	0.2	0.1	0.08	0.05	0.03
Total	100	100	100	100	100	100	100	100	100	100
Solution color	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent
Precipitation color	Light red	Light red	Light red	Gray/purple	Gray/purple	Gray/purple	Gray/purple	Gray/purple	Gray/purple	Gray/purple
Degree of discoloration (visual evaluation)	○	○	○	×	×	×	×	×	×	×

Antibacterial zeolite A: Zeolite containing silver ions and zinc ions (average particle size approximately 1.5 micrometers)

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[Table 2]

	Examples			Comparative examples						
	4	5	6	8	9	10	11	12	13	14
Ion-exchanged water	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Ethanol (95% synthesized)	50	50	50	50	50	50	50	50	50	50
Chlorhydroxy aluminum 50% aqueous solution (Antiperspirant)	20	20	20	20	20	20	20	20	20	20
PDE (10) POP (20) decyltetradecyl ether (dispersing agent)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Anti-bacterial zeolite B (preservative)	1	1	1	1	1	1	1	1	1	1
Trisodium ethylenediaminehydroxyethyl triacetate	0.1	0.05	0.01							
EDTA-3Na·2H ₂ O					0.3	0.2	0.1	0.08	0.05	0.03
Total	100	100	100	100	100	100	100	100	100	100
Solution color	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent	Transparent
Precipitation color	Light red	Light red	Light red	Gray/purple	Gray/purple	Gray/purple	Gray/purple	Gray/purple	Gray/purple	Gray/purple
Degree of discoloration (visual evaluation)	O	O	O	x	x	x	x	x	x	x

Antibacterial zeolite B: Zeolite containing silver ions, zinc ions, and ammonium ions (Zeomic AJ10N from Sinanen Zeomic Co., Ltd., average particle size approximately 1.5 micrometers)

[0062]

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The aforementioned results show that Comparative examples that do not contain trisodium ethylenediaminehydroxyethyl triacetate and Comparative examples that contain a chelating agent EDTA-3Na · 2H₂O exhibit discoloration of precipitated white powder of antibacterial silver zeolite into gray/purple, resulting in a larger degree of discoloration.

On the other hand, Examples containing trisodium ethylenediaminehydroxyethyl triacetate exhibit only slight red discoloration of the precipitated antibacterial silver zeolite; and the degree of discoloration is very small and within the allowable range for endermic liniments; which indicates a superior antidiscoloration effect.

[0063]

Other Examples of the present invention are shown below.

[0064]

Example 7: Pressed powder	
Aluminum hydroxychloride	5 mass %
Zinc oxide (zinc flower)	5
Talc	76.99
Liquid petrolatum	3
Antibacterial zeolite B	10

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Trisodium ethylenediaminehydroxyethyl triacetate

0.01

[0065]

Example 8: Loose powder

5	Aluminum hydroxychloride	5 mass %
	Zinc oxide (zinc flower)	5
	Talc	79.99
	Antibacterial zeolite B	10
	Trisodium ethylenediaminehydroxyethyl triacetate	
10		0.01

[0066]

Example 9: Lotion-type spray

(Stock solution recipe)

	Purified water	10 mass %
15	Aluminum hydroxychloride	10
	Anhydrous ethyl alcohol	73.9
	Isopropyl myristate	2
	1,3-butylene glycol	3
	Antibacterial zeolite B	1
20	Trisodium ethylenediaminehydroxyethyl triacetate	
		0.1

(Filler recipe)

	Stock solution	50
	LPG	50

25 [0067]

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Example 10: Powder spray

	Aluminum hydroxychloride	20 mass %
	Silicic acid anhydride	15
	Talc	20.21
5	Zinc oxide (zinc flower)	5
	Isopropyl myristate	21.79
	Dimethyl polysiloxane	10
	Sorbitan fatty acid ester	3
	Antibacterial zeolite B	5
10	Trisodium ethylenediaminehydroxyethyl triacetate	0.1
	(Filler recipe)	
	Stock solution	10
	LPG	90

15 [0068]

Example 11: Powder spray

	Aluminum hydroxychloride	20 mass %
	Silicic acid anhydride	15
	Talc	20.21
20	Zinc oxide (zinc flower)	5
	Isopropyl myristate	21.79
	Polyoxyethylene/polypropylene random polymer	
	methyl ether	10
	Sorbitan fatty acid ester	3
25	Antibacterial zeolite B	5

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Trisodium ethylenediaminehydroxyethyl triacetate

0.1

(Filler recipe)

Stock solution 10

5 LPG 90

[0069]

Example 12: Stick

Aluminum hydroxychloride 20 mass %

Talc 7.9

10 Zinc oxide (zinc flower) 5

Solid petrolatum wax 2

Stearyl alcohol 8

Liquid petrolatum 15

Cyclic dimethyl polysiloxane 36

15 Sorbitan fatty acid ester 1

Antibacterial zeolite B 5

Trisodium ethylenediaminehydroxyethyl triacetate

0.1

[0070]

20 Example 13: Cream

Purified water 45 mass %

Squalane 20

Cyclic dimethyl polysiloxane 15

Glyceryl diisostearate 3

25 Diethoxyethyl succinate 5

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Organically modified montmorillonite

1.5

1,3-butylene glycol

5.49

Antibacterial zeolite A

5

5 Trisodium ethylenediaminehydroxyethyl triacetate

0.01

[0071]

Example 14: Emulsion

Purified water

20 mass %

10 Aluminum hydroxychloride

20

Octyl-p-methoxycinnamate

5

Oxybenzone

3

4-tert butyl-4'-methoxybenzoylmethane

1

15 Hydrophobically treated zinc oxide 5

Polyoxyethylene/polypropylene random polymer

methyl ether

10

Silicone oil

15

Silicone resin

1

20 Glyceryl diisostearate

1

Organically modified montmorillonite

0.5

1,3-butylene glycol

5.49

Antibacterial zeolite B

13

25 Trisodium ethylenediaminehydroxyethyl triacetate

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0.01

[0072]

Example 15: Ointment

	Purified water	53.74 mass %
5	Aluminum hydroxychloride	20
	Glycerin	10
	1,3-butylene glycol	3
	Caustic potash	0.25
	Stearic acid	2
10	Stearic acid monoglyceride	2
	Cetanol	1
	Liquid petrolatum	5
	Petrolatum	2
	Antibacterial zeolite B	1
15	Trisodium ethylenediaminehydroxyethyl triacetate	0.01

[0073]

Example 16: Gel

	Purified water	63.27 mass %
20	Aluminum hydroxychloride	20
	Dipropylene glycol	5
	PEG 1500	5.5
	Carboxyvinyl polymer	0.4
	Methylcellulose	0.2
25	POE(15) oleyl alcohol ether	0.5

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Potassium hydroxide 0.1
EDTA 0.02
Antibacterial zeolite B 5
Trisodium ethylenediaminehydroxyethyl triacetate
5 0.01

[0074]

Example 17: Wet sheet

Purified water 62.81 mass %
Anhydrous ethyl alcohol 35
10 Polyoxyethylene hydrogenated castor 0.1
Citric acid (food) 0.02
Sodium citrate 0.06
Antibacterial zeolite B 2
Trisodium ethylenediaminehydroxyethyl triacetate
15 0.01

[0075]

[Effects of the invention]

The present invention can provide an
endermic liniment containing antibacterial zeolite
20 that exhibits the effect of preventing
discoloration of the endermic liniments and/or
reducing the degree of discoloration.

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[Document title] Abstract

[Abstract]

[Object] The object is to provide an endermic
liniment containing antibacterial zeolite that
5 exhibits the effect of preventing discoloration of
the endermic liniments and/or reducing the degree
of discoloration.

[Means to achieve the object] An endermic
liniment comprising antibacterial zeolite and
10 trisalt ethylenediaminehydroxyethyl triacetate.

[Selected drawings] None